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Diversity of Spiders fauna from Tableland, Panchgani, Maharashtra, India.

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ABSTRACT:

The Spiders are more abundant, predatory groups in the world of arthropods. They act as indicators of environmental conditions and act as biological control agents in agricultural ecosystems. The present study of the spider fauna of Table land, Panchgani located in Satara District. A total of 20 species belong to 12 genera and 06 families were sampled during the month of July 2023.The current study is preliminary to discover the spider fauna in study area.

The family Salticidae constitute most predominant family (60%), followed by Oxyopidae (10%), Theridiae (10%), Gnaphocidae (10%), Thomisidae (05%), Araneidae (05%). The described families Salticidae is presiding 12 species. The second presiding Oxyopidae family having 02 species, Theridiiae having 2 species, and Gnaphocidae 02 species and Thomisidae and Araneidae 1 species each. The families present order Salticidae > Oxyopidae > Theridiae > Gnaphocidae > Thomisidae = Araneidae.

Keywords: Diversity, Spiders, Table land, Panchgani.

1. Introduction:

Spiders (Arachnida: Araneae) are one of the most captivating and diverse invertebrates in animal world. Spiders are the most diverse group of terrestrial invertebrates (Sharma and Singh,2020). The spider belongs to class Arachnida of phylum Arthropoda and ranked 17 in total species diversity among the order of animal kingdom. The spiders are the most entomophagous predators in several agro ecosystem and their presence is frequently associated with structural quality of the ecosystem due to their effect on bio control of insects and pests (Riechert, and Lockley,1984).

In all over the world 51293 species of spiders belonging to 132 families and 27 genera (World spider catalog, 2023). They are group of predators that occurs in various physical and biological conditions of terrestrial environment (Foelix,1996).

In India the spider studied by Tikader (1980-1987), spiders are controlling insect population in agricultural and forest ecosystem. They serve as biological control agent are best practices to reduce use of environmentally hazardous chemical pesticides as well as population of insect pests(Ghafoor and Mohamood,2011). Because of less research work on arthropodan diversity in most area of Maharashtra are remained undiscovered. In Wayand district recorded 19 species belonging to 10 families (Andrew 2021), also new species of the genus *Oxyopes latrielle* discovered from sahayadri region of western ghat (Kulkarni and Deshpande, 2012)

The current work we discover the spider fauna preliminary study regarding diversity of high altitude area of table land, Wai Maharashtra area, to create the awareness of their conservation.

2. Materials and methods:

i) Study area: The Panchgani village is one of the most famous hill station in district Satara of Maharashtra state. Total area 4.31 km. It set high on the western ghat altitude ranging from Latitude 17.92393° and Longitude 73.804997° and 1326 m above from sea level. The table land is type of grassland covered around the forest

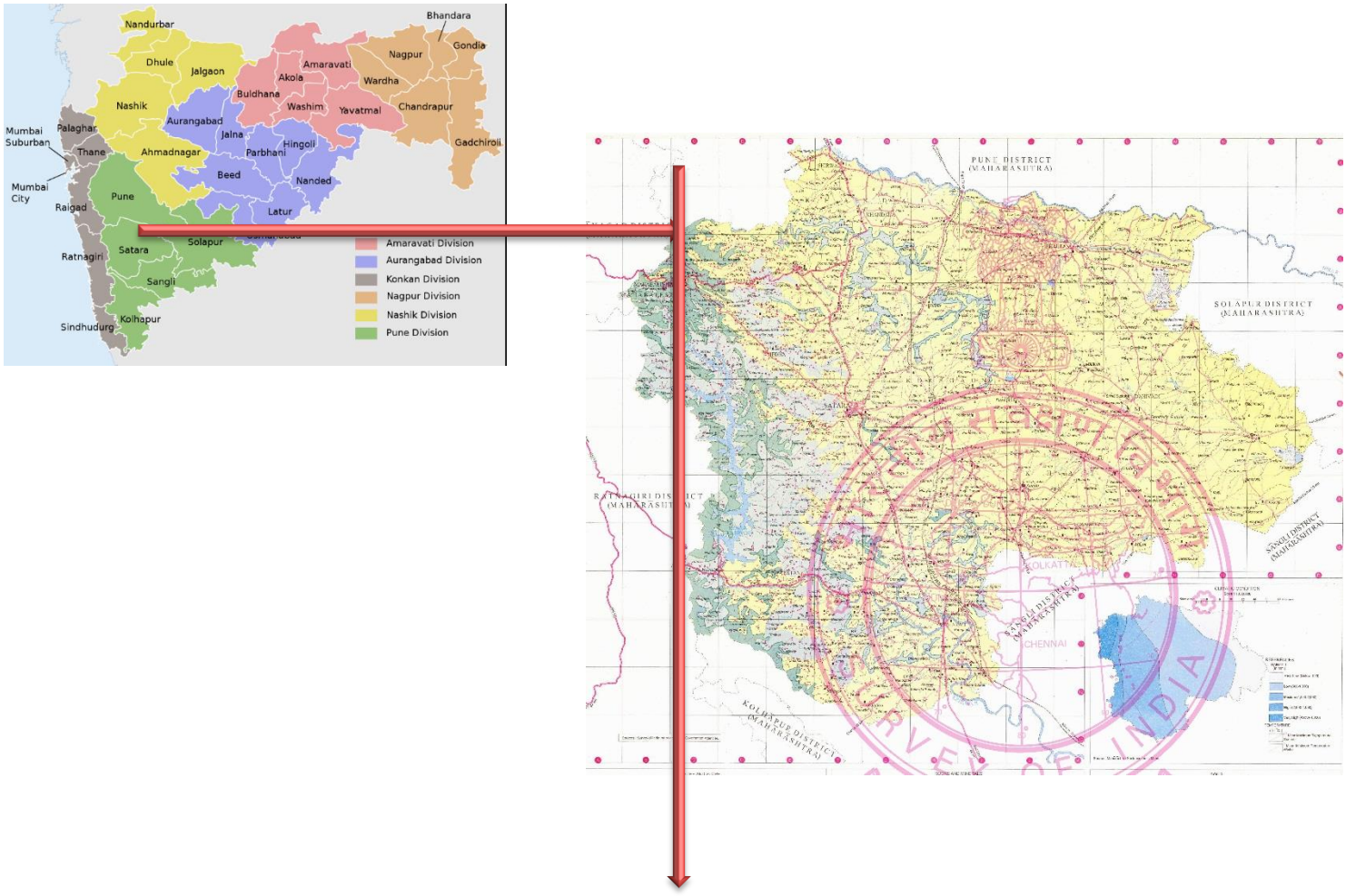


Fig:1 Map of Table land Panchgani, Maharashtra.

i) Collection and Identification:

The study was carried out month of July 2023 by quadrats method. The spiders are sampled ground, pillar blocks, foliage, and bushes. The specimen were collected by hand-picking, visual search, beating method and inverted umbrella, sweep net methods are used.

The observation is done by using stereo zoom microscope and also using Realme 7 pro 64 mp camera. The GPS photograph were taken during sampling.

3) Specimen Collection methods:

a) Hand Picking method:

This method used for collection of spiders inhabiting on ground for this explored places like leaf litter, forest floor level (Cardoso et al., 2008; Hippaggi, R.V 2011).

b) Sweep netting:

Spiders inhabiting grasses, small shrubs were sampled with sweep net (Coddington et al.,1991). For sweep netting a round sweep net made up of nylon mesh (1.5mm), having a diameter of 28cm (Aluminum ring) and 1m long handle was used (Churchill and Arther,1991; Cardoso et al.,2008).

c) Beating:

Spiders from woody trees collected in plastic sheet by beating trees and shrubs stiks. The collected spiders specimen is photographed in natural life.

d) Pitfall sapling:

Pitfall traps are for collecting surface active ground dwelling and leaf litter inhabiting spiders (Brennan, 2005).

e) Areal hand collection:

The areal hand collection method applied for collection of free living foliage dwellers. In this method spiders searching on vegetation and collect the spiders visible from knee level (Sorensen et al.,2002; Scharff et al.,2003).

Preservation:

Preservation was done in 70% Ethyl alcohol used and stored in plastic container (Tikader Handbook Indian Spiders, 1987).

Identification:

The collected spiders specimen were identified by standard identification keys, systematic references (Tikader,1987 and Pocock,1900)

4) Result and Disscussion:

During the present study a total 20 species belonging to 06 families have been recorded from Table land area of Panchgani. The families are observed are Salticidae, Oxyopidae, Theridiae, Thomocidae, Araneidae, Gnaphocodae

The aim of the study to calculate diversity of spiders species in Table land area.

The observed number of species belonging to families Salticidae(11), Oxyopidae(02), Theridiiae (02), Gnaphocodae(02), Thomocidae(01), Araneidae (01), The statistical studies Shannon –Wiener diversity index are 0.85.

Sr. No	Family	Species	Number of Sp.
1	Salticidae	i) *Rhene flavicomans* (L. Koch,1846)	04
		ii) *Telamonia dimidiate* (Simon, 1899)	03
		iii) *Phiddipus sp.* (Hentz, 1845)	02
		iv) *Chrysilla volupe* (Karsch, 1879)	01
		v) *Marpissa mucosa* (Clerck, 1757)	01
		vi) *Hentzia sp.* (Hentz, 1832)	01
2	Oxyopidae	i) *Oxyopes salticus* (Thorell,1857)	01
		ii) *Hamadruas hieroglyphica* (Thorell,1857)	01
3	Theridiiae	*i) Theridion pictipes* (Keyserling, 1884)	02
4	Gnaphocidae	*i) Drassyllus sp.* (Chamberlin, 1922)	02
5	Thomosidae	*i) Thomisus sp.* Sundevall, (C. J. (1833)	01
6	Araneidae	*i) Argope anasuja* (Thorell, 1887)	01
		Total	**20**

List of Spiders collected during the study site (Table 1)

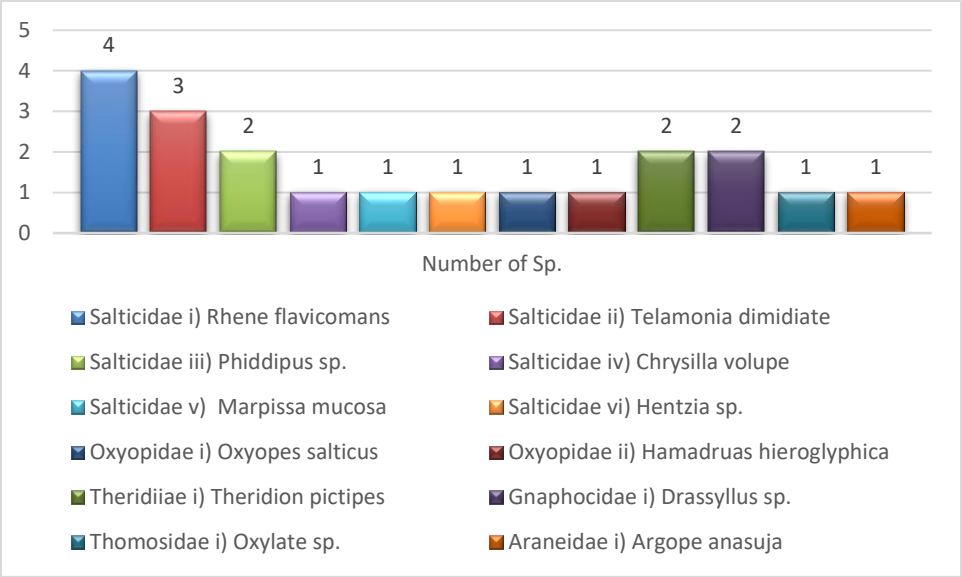


Fig.2 Graphical representation of Spiders families in the sampling area of study site.

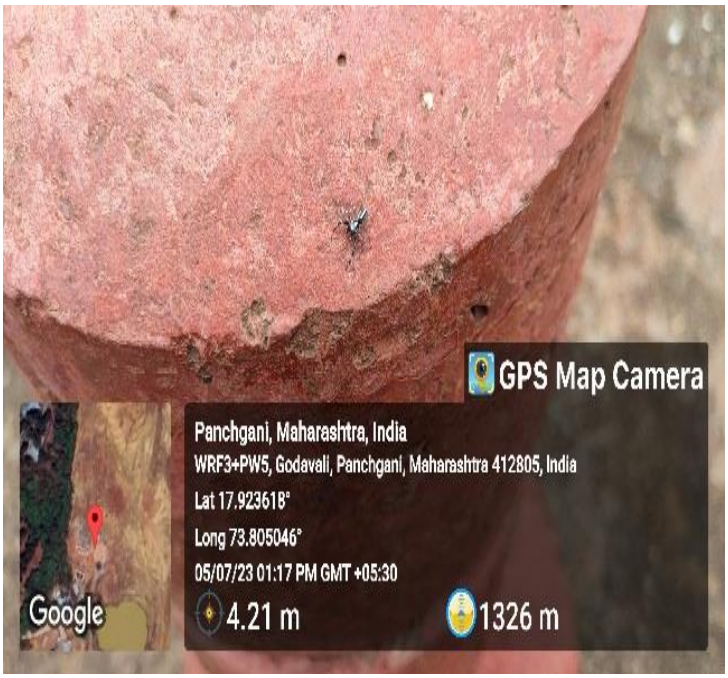
Sr. No	**Spider Families**	**Species Found**	**Pi= Sp. Found/sum of species**	**Pi^2**	**Shannon – Wiener index H= Pi In [Pi]**	**Measure**	**Values**
1	Salticidae	12	0.6	0.36	-0.306	**S**	**20**
2	Oxyopidae	2	0.1	0.01	-0.046	**D**	**0.39**
3	Theridiiae	2	0.1	0.01	-0.046	**1-D**	**0.6**
4	Gnaphocidae	2	0.1	0.01	-0.046	**1/D**	**1.65**
5	Thomosidae	1	0.05	0.0025	-0.0149	**H**	**0.85**
6	Araneidae	1	0.05	0.0025	-0.0149	**E**	**2.56**
Total		**20**	**01**	**0.395**	**-0.4278**		

Table No : 2 Species Richness Diversity index of Spiders.

S = Species Richness
D= Simpson's Index [D=Sum (Pi^2)]
1-D= Simpson's index Diversity
1/D= Simpson's reciprocal index
H= Shannon –Wiener index (Pi In [Pi])
E= Species Evenness H/In (S)

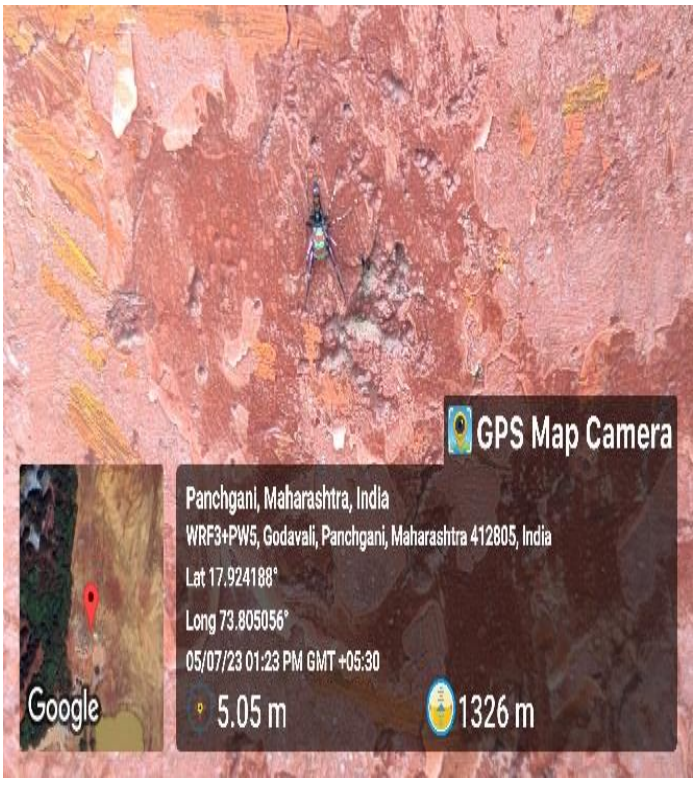
Abundance of collected spider specimens:

Rhene flavicomans



Telamonia dimidiate

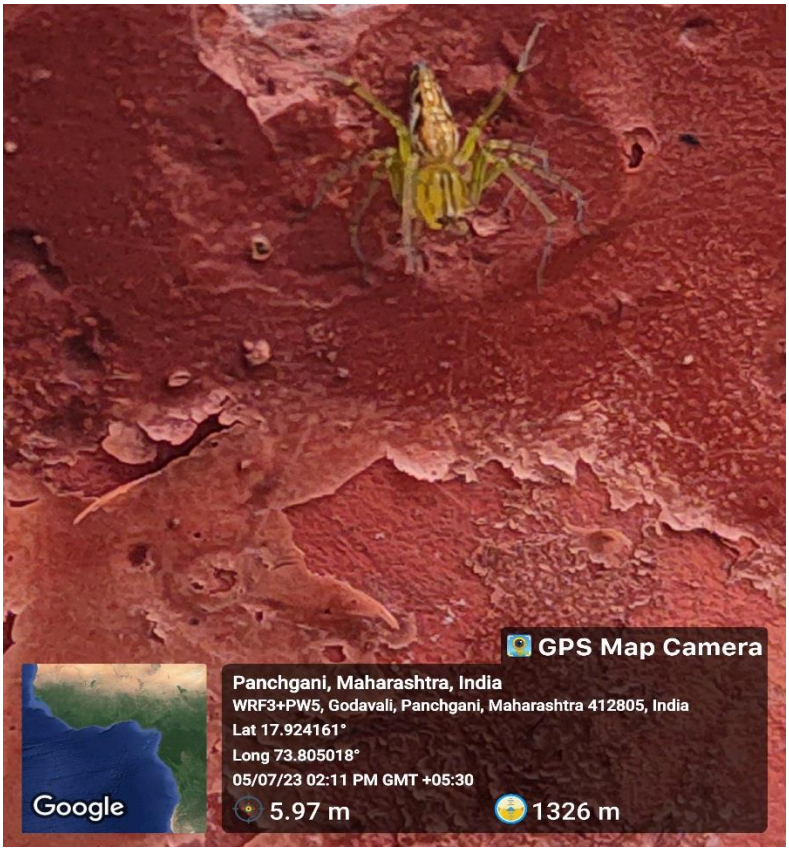
Phiddipus sp.



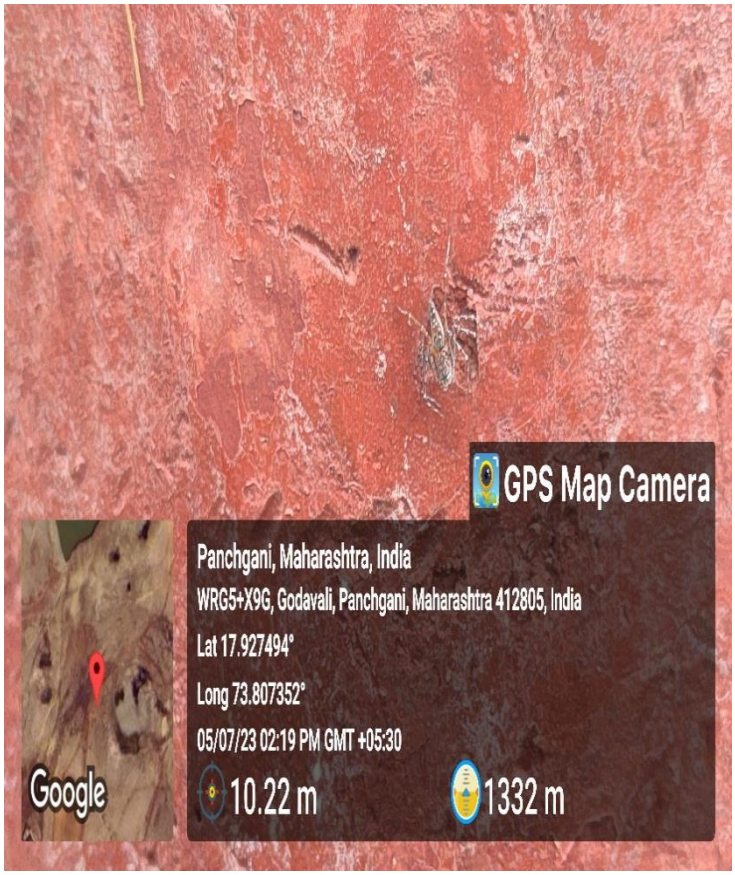
Chrysilla volupe

Marpissa mucosa

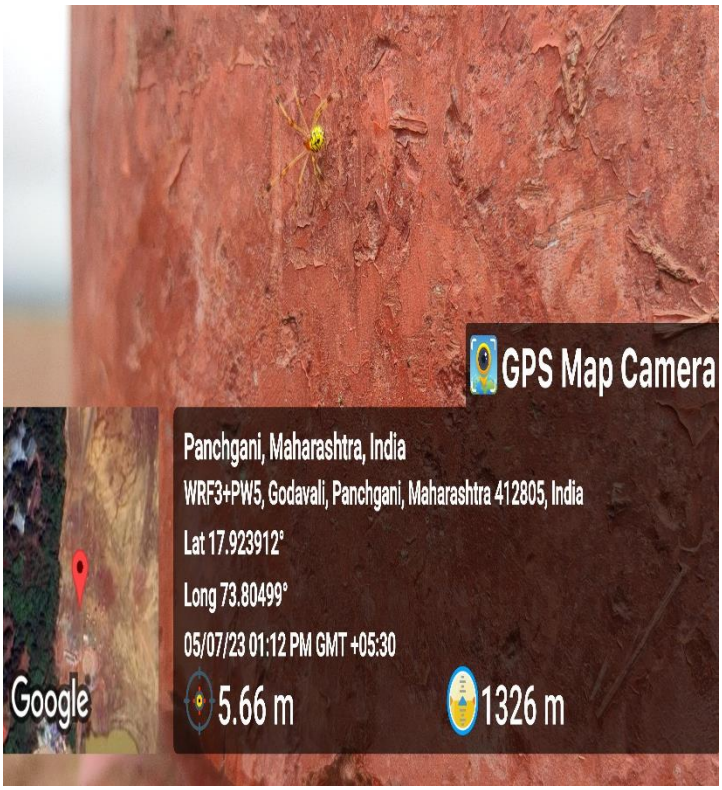
Hentzia sp.



Oxyopes salticus

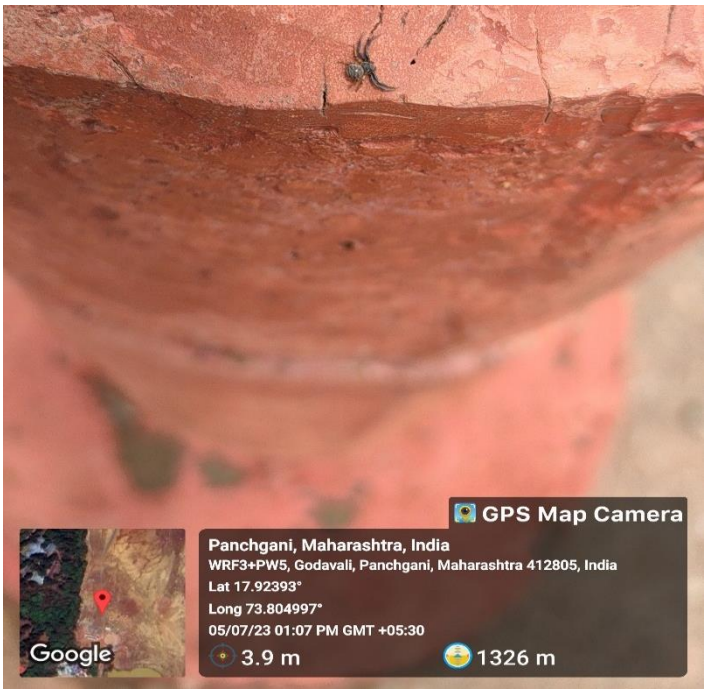


Hamadruas hieroglyphica



Theridion pictipes

Drassyllus sp.



Thomisus sp.

Argope anasuja

5.Morphological characteristics of collected families:

i) Salticidae (Blackwall,1841) : These are small to medium sized active hunting spiders and are commonly known as jumping spiders. The cephalothorax has distinct rectangular quadrangle. Eight eyes are present arranged in 3-4 rows, large anterior median eyes are present. Abdomen round oval, covered with hairs. Legs are segmented. (Upper Assam Biodiversity board, 2015). A total 307 species reported from India. (Caleb, J.T.D. and Sankaran, P.M, 2023 Araneae of India Ver. 2023).

ii) Oxyopidae (Thorell,1870): These are small to large sized foliage dwelling and commonly called as lynx spider. Cephalothorax is elongated usually with strips and spots. Eight eyes are arranged hexagonally on two rows. Chelicerae are long with short fangs. Abdomen is elongated with bands, spots,strips. Legs are long, three clawed and covered with spines. (Upper Assam Biodiversity board, 2015). A total 88 species reported in India. (Caleb, J.T.D. and Sankaran, P.M, 2023 Araneae of India Ver. 2023).

ii) Theridiidae: Are also known as the tangle-web spiders, cobweb spiders and comb-footed spiders, is a large family of araneomorph spiders first described (Carl Jakob Sundevall,1833)

iv) Gnaphocidae: Generally, ground spiders are characterized by having barrel-shaped anterior spinnerets that are one spinneret diameter apart. The main exception to this rule is found in the ant-mimicking genus Micaria. Another characteristic is an indentation in the endites (paired mouthparts anterior and lateral to the labium, or lip). All ground spiders lack a prey-capture web and generally run prey down on the surface. They hunt at night and spend the day in a silken retreat (Nieuwenhuys, Ed, 2000) Nieuwenhuys, Ed (2000).

v) Thomisidae (Sundevall,1833): These are small medium sized spiders commonly known as crab spiders. Cephalothorax various in shape. Eight eyes are arranged in two rows. Abdomen various size and shape and color tends to camouflage with background, legs with two claws. (Upper Assam Biodiversity board, 2015). A total 185 species reported in India (Caleb, J.T.D. and Sankaran, P.M, 2023 Araneae of India Ver. 2023).

vi) Araneidae (Clerk,1757) : These are small to medium spiders, commonly knows orb weaver. Members of this family generally build orb webs often found in gardens, fields, and forests, eight eyes are present arranged in two rows, chelicerae are strong. (Upper Assam Biodiversity board, 2015). Total 196 species reported in India. (Caleb, J.T.D. and Sankaran, P.M, 2023 Araneae of India Ver. 2023).

6) Conclusion:

The study of diversity of spiders are 20 species belonging to 06 families and 12 genera are recorded. The seasonal abundance are higher in month of June – July is observed, The Shannon – Wiener diversity index are 0.85 conclude that spiders species are divers some extent in given area. Their feeding potential was remarkable range. They also controlling ecological equilibrium by

destroying the insect pests. The study also help in the development of pest management programme in future.

7) Acknowledgement:

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